

member **41** and allows the semiconductor image sensing elements **40** having excellent properties to be obtained. It is also possible to use the optical member with the tilted surface or the rough surface described in the first embodiment.

[0104] FIG. 9 is a cross-sectional view showing a structure of the semiconductor image sensing device **45** constructed by using the semiconductor image sensing element **40** according to the present embodiment. The structure of the semiconductor image sensing device **45** and the fabrication method therefor are the same as the structure and fabrication method described with reference to FIGS. 4A to 4D in the first embodiment so that the description thereof will be omitted.

[0105] In the semiconductor image sensing device **45** having such a structure, the incidence of a reflected light beam or a scattered light beam from the metal thin wires **35** on the image sensing area **13** can be prevented and optical noise such as flare or smear can be prevented. The burying resin **36** is not limited to a light shielding material. For example, a transparent resin material may also be used instead. In that case also, the light shielding member **42** formed on the side surface region of the optical member **41** can prevent the incidence of a reflected light beam or a scattered light beam on the image sensing area **13**.

Embodiment 3

[0106] FIG. 10 is a cross-sectional view showing a structure of a semiconductor image sensing element **50** according to the third embodiment of the present invention. FIG. 11 is a cross-sectional view showing a structure of a semiconductor image sensing device **60** using the semiconductor image sensing element **50**.

[0107] The semiconductor image sensing element **50** according to the present embodiment is a semiconductor image sensing element with bumps which is constructed by providing bumps **51** on the electrode portions **15** of the semiconductor image sensing element **10** according to the first embodiment.

[0108] As the bumps **51**, stud bumps using wire leads or bumps made of solder balls can be used by way of example. The formation of the bumps **51** by a stud bump process is performed by using gold wires, copper wires, or the like. Since the formation method is well known, the description thereof will be omitted. Ball bumps made of solder balls can also be formed on the electrode portions **15** by using a well-known technology. Preferably, the bumps **51** are formed after dividing the semiconductor wafer into the separate individual semiconductor image sensing elements **50**. However, the bumps **51** may also be formed while the semiconductor image sensing elements **50** are still in the state of the semiconductor wafer.

[0109] The semiconductor image sensing element **50** having such a structure can not only prevent optical noise but also suppress electric noise since the bumps **51** provide connection between the electrode portions **15** of the semiconductor image sensing element **50** and the mounting substrate.

[0110] A description will be given next to a structure of the semiconductor image sensing device **60** with reference to FIG. 11. The semiconductor image sensing device **60** has the

semiconductor image sensing element **50** described above, a mounting substrate **52** having an opening (shown in FIGS. 12A to 12C) wider than at least the image sensing area **13** of the semiconductor image sensing element **50** and having electrode terminals **53** arranged around the opening to be connected to the electrode portions **15** of the semiconductor image sensing element **50** by a face-down mounting method, and a molding resin **54** formed on a mounting region between the mounting substrate **52** and the semiconductor image sensing element **50** connected to the electrode terminals **53** via the bumps **51** provided on the surfaces of the electrode portions **15** of the semiconductor image sensing elements **50** and mounted on the mounting substrate **52** and on the portion of the mounting substrate **52** which is adjacent to the mounting region.

[0111] The mounting substrate **52** has a wiring pattern and the electrode terminals **53** connected thereto which are formed on at least one surface of a glass epoxy resin substrate or a substrate using an aramid resin.

[0112] FIGS. 12A to 12C are cross-sectional views illustrating the main process steps of a method for fabricating the semiconductor image sensing device **60**.

[0113] First, as shown in FIG. 12A, the side of the semiconductor image sensing element **50** formed with the optical member **18** is aligned with respect to the opening **56** of the mounting substrate **52**.

[0114] Next, as shown in FIG. 12B, the semiconductor image sensing element **50** is pressed in the direction of the mounting substrate **52** so that the electrode portions **15** and the electrode terminals **53** are connected via the bumps **51** by a flip-chip method. In this case, when the bumps **51** are solder bumps, connection can be provided by thermally melting the bumps **51**. When the bumps **51** are stud bumps using gold wires, a method which provides connection by using ultrasonic bonding, thermal compression, a conductive adhesive agent, or the like can be used. In the method shown in FIG. 12, a solder paste **57** is coated on the electrode terminals **53** by using a printing method so that connection is provided by soldering.

[0115] Next, as shown in FIG. 12C, a light-shielding liquid resin such as a liquid filler made of, e.g., an epoxy resin is injected and filled in the clearance between the principal surface of the semiconductor image sensing element **50** and the surface of the mounting substrate **52** which is formed with the electrode terminals to cover the sidewall portions of the opening **56**, the exposed region of the transparent bonding member **20**, and the side surface region of the optical member **18**. When the liquid filler is cured, it forms the molding resin **54**. In this case, a photosensitive liquid filler is injected from the side of the mounting substrate **52** which is provided with the electrode terminals **53**, while it is simultaneously irradiated with a UV light beam from the side provided with the optical member **18**. As a result, the liquid filler is injected into the mounting region connected to the bumps **51** by the solder paste **57**, further flows toward the optical member **18**, and is cured by irradiation with the UV light beam. As a result, the seeping of the liquid filler over to the upper surface of the optical member **18** can be reliably prevented. Thereafter, the entire liquid filler is naturally or thermally cured to form the molding resin **54**.

[0116] Since the light shielding film **19** is formed on the side surface region of the optical member **18** in the semi-